PLANNING AND SUBMISSION REQUIREMENTS FOR ANNUAL OPERATING PLANS

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Manitoba Natural Resources

Forestry Branch

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PREFACE

Over the last few years Manitoba Natural Resources has undertaken new initiatives to promote a more integrated and sustainable approach for managing the province's natural resources. Examples of such initiates include the reorganization of the Department and the introduction of a number of operating guidelines. These initiatives are intended to ensure that due consideration is given to the environmental impacts of forest planning and development, and the effects that these activities may have on other resources and resource users. While the Department as a whole is responsible for ensuring sustainable development and integrated management of the Province's natural resources, it is the regional integrated resource management teams (IRMT) that are responsible for delivering integrated resource management policies and guidelines at the regional level. The IRMTs review mandate includes harvesting and renewal plans.

For commercial harvesting and renewal operations the process through which annual timber harvesting and associated operations are planned and reviewed for approval is the Annual Operating Plan (AOP). The AOP documents, in the greatest detail, the activities proposed for the current year and specifically where, when and how these activities will be carried out. Annual Operating Plans are reviewed and approved by the Department of Natural Resources. However, past attempts to achieve a balanced and consistent application of the integrated resource management policies and guidelines in the preparation and review of annual harvesting plans has been difficult. Expectations of operational plans and the planning process varied widely. In addition, responsibilities regarding plan content were not clearly defined, resulting in considerable apprehension among regional resource managers in approving annual plans.

After a thorough review of the situation the Forestry Branch concluded that well defined guidelines were needed to not only guide the preparation of annual operating plans, but to clearly outline participant responsibilities regarding content, level of detail, communication and the process for review and implementation of the proposed activities. These guidelines will provide direction to the proponent in preparing operating plans and assist departmental resource managers in reviewing harvest operations in a consistent, fair, efficient and effective way. The planning and submission guidelines will apply to all private and public sector commercial harvest operations on provincial Crown land. The guidelines will be subject to periodic review to ensure appropriateness in application and to incorporate the most recent knowledge and understanding of the Province's natural resources.

INTRODUCTION

These guidelines have been developed to provide direction to planners in the preparation of annual operating plans for timber harvest operations in Manitoba. The guidelines outline the processes, responsibilities and level of detail necessary to ensure a complete and comprehensive planning document, addressing, in an integrated manner, all resource issues.

The Annual Operating Plan (AOP) is generally prepared within the controlling framework of a longer term (10 year) forest management plan. Under Manitoba Environment regulation 164/88 the 10-year forest management plan must obtain an environmental license. This not only includes a thorough inter-departmental review but the proponent of the plan may also be required to prepare an environmental impact assessment. In addition, public hearings may be ordered by the Minister of Environment before a license can be issued. Unlike the forest management plan, the AOP concerns a short period of time. However, it must conform to the broader long term forest management plan and the conditions of the environmental license. While a forest management plan, because of its long term nature and magnitude of development, is required to undergo rigorous inter-departmental review the short term, site specific AOP requires only Departmental approval. Therefore, the AOP is the format through which logging and associated operations, proposed to be conducted within any 12 month period (i.e. between April lst and March 31st of the following year), are reviewed for approval by the Department of Natural Resources.

The requirement for an AOP is outlined in the Manitoba Forest Act and Regulations and in forest management license agreements. Annual Operating Plans are to be prepared in accordance with provincial acts and statutes governing development activities on Crown lands and various guidelines pertaining to forest management activities within the Province of Manitoba. Examples of such guidelines include but are not limited to the *Forest Management Guidelines for Wildlife in Manitoba, Recommended Fish Protection Procedures for Stream Crossings in Manitoba, Maintenance Guidelines for Resource and Recreation Roads, Recommended Procedures for Protecting Fish Habitat in Lakes and Streams in Forest Cutting Areas* and *Harvesting Practices for Forest Operations in Manitoba.*

Regional Integrated Resource Management Teams (IRMT), within Manitoba Natural Resources Operations Division, and resource branches, are responsible for the review of annual operating plans. Regional recommendations for approval or non-approval are forwarded to the Director of Forestry. The AOP must be approved in whole or in part before any operations may be conducted on a forest management license or timber sale area.

PLAN DEVELOPMENT AND CONSULTATION PROCESS

PRELIMINARY PLANNING PHASE

Communications between a proponent and Departmental resource managers during the preparation of an AOP, should be frank and explicit. Resource development issues must be addressed early on in the planning process and all participants must be involved. The plan should develop based on an accumulation of proposals and subsequent agreements, culminating in a final document that reflects as accurately as possible the understanding of all participants. To this end, discussions on the AOP must begin one year in advance of actual operations or at least at the conclusion of the previous year's winter operations. These initial discussions should consist of informal talks encompassing an exchange of ideas between Departmental Resource Managers and the proponent. The discussions are intended to assist the proponent in preparing the final draft of the AOP. It is expected that these discussions and subsequent draft proposals would be based upon the best available data (photographs, maps, resource surveys) and supported, where necessary, by appropriate field work. However, it is understood that draft proposals arising out of discussions may require changes and/or stakeholder input. Therefore, the proponent is expected to present, to regional IRMTs for joint review, at least one rough draft of the plan prior to submitting the final document. The presentation of draft proposals should be consistent with the AOP format described in the following pages. **It is important to remember that during the planning phase the proponent and Manitoba Natural Resources should carry out joint field inspections and review the draft proposals with the goal of reaching agreement prior to the submission of the final draft.**

Natural Resources input into the plan must be timely and sufficiently detailed to ensure that resource concerns are adequately identified and mitigated. For example, detailed wildlife concerns and management opportunities will be addressed during the preliminary planning phase to ensure that:

a) "Sensitive" areas, proposed to undergo harvest operations, are identified early on in the planning process and;

b) the proponent receives timely notice when determinations are made regarding the requirement for detailed harvesting, reforestation and road development/management plans and;

c) the proponent is advised in advance as to which wildlife species requires primary consideration in the harvest layout/design for each operating area.

Mitigation of resource concerns will be incorporated into the plan during its preparation and not deferred to the work permit stage. Any mitigation through work permits during the course of operations are expected to be infrequent and would only be conducted under exceptional circumstances.

To properly prepare the AOP (incorporating agreed upon mitigation for identified resource concerns) the proponent is expected to be knowledgeable of site, timber conditions and resource issues in the areas proposed for harvest. It is assumed that the final draft of the plan, submitted for approval, in advance of harvest operations, will be based on comprehensive field work and will have specific harvest boundaries and main roads accurately located on maps.

NATURAL RESOURCES RESPONSE MECHANISM

The AOP is submitted to Manitoba Natural Resources for review and approval. The IRMT will review the plan contents from a regional perspective. The regional review may involve consultation with various stakeholder groups. Regional comments are then forwarded to the Director of the Forestry Branch who subsequently presents the plan, together with the regional responses, to the Integrated Directors Group (IDG). The IDG consists of directors from the various resource branches and the director of the Policy Coordination Branch. Once the plan and accompanying comments are reviewed by the IDG, a provincial response is developed and forwarded to the proponent. In a return response to the Director of Forestry the proponent addresses all concerns which may have been raised. The proponent's response must incorporate any additionally requested information, clarification or mitigation. The amendments are considered as an addendum to the submitted annual plan. A satisfactory response results in an approved AOP. Operations are then carried out in accordance with the approved AOP and specific conditions of approval either outlined in the plan or the response addendum.

FIELD OPERATIONS

District Natural Resource Officers (NROs) will monitor all harvest activities to ensure they are in accordance with the approved AOP and are in keeping with the requirements of various acts, regulations, policies and operating guidelines.

It is recognized that from time to time forest operations may experience exceptional circumstances or unusual operating conditions, which could make it difficult for operators to adhere to the operating plan or conditions of approval. In such cases, Natural Resources staff, responsible for timber supervision and enforcement, have the authority to modify conditions of approval or planned events, provided that these changes do not unduly compromise the approval agreement, undermine sound resource management practices, or threaten the ecological integrity of an area recognized as worthy of protection. For example, this approval authority might include a minor change in road location or cutblock boundary to avoid wet operating conditions but not include a change to a specific condition imposed by the Department of Environment such as culvert size. The latter type of modifications must be referred to the IRMT.

Before any harvesting or related activity commences the operator must first obtain a **General Operating Permit** from the Timber Administration section of the Forestry Branch. The General Operating Permit grants authorization to carry out harvesting and related activities on provincial crown land. In addition to the General Operating Permit the operator must also obtain a Crown land **Work Permit**.

Work Permits, a requirement of the *Fires Prevention Act* and *Crown Lands Act*, give notice to District resource staff that work activity is about to commence in a specific location. All field activities must be covered under work permit. The work permit may be obtained from the District Natural Resource Officer. The work permit may also be used to convey site specific conditions of operation, field amendments to planned events or existing conditions of operation and to control the sequence or timing of field activities.

ANNUAL OPERATING PLAN

FORMAT AND CONTENT

The following section outlines Manitoba Natural Resources' expectations regarding the format and content of AOPs. The proponent is responsible for the preparation of an AOP consisting of:

A) A three year general projection.

B) Development proposals for current year.
1) Harvesting and road access,
2) Cut-block proposal details as required,
3) Road management, construction and maintenance activities,
4) Contingency areas,
5) Forest renewal activities,
6) Stand tending/enhancement activities.

The level of detail to which the above must be submitted is outlined as follows.

THREE YEAR GENERAL PROJECTION

The general projection, based upon the 10 year forest management plan, provides an overview of projected road development and harvest sequencing for the supply of timber to a mill or for re-sale for at least two years beyond the AOP. The general projection shall include in tabular and map form (scale 1:250,000 or larger) the following:

a) General operating areas.
- operating areas should average approximately 900 square kilometres and be bordered by logical topographical features such as heights of land, watersheds, large swamps or man-made features such as roads and cutovers. In this regard, managers are expected to exercise sound, sensible judgement and practical boundaries, best suited to the requirements of each specific situation.

b) A projected harvesting sequence indicating the year which any present or future harvest area is to be operated.

c) Volume estimates for all cut-blocks or cutting compartments within the operating areas.

d) Projected construction schedule for all access roads.

e) Road retirement program.

f) Projected schedule of seedling/stock requirements by seed zone.

Examples of an appropriate table and map can be found in Appendices I and II.

The general development section should also include a brief discussion of key issues which will influence the activities proposed for the projected developments. Discussions should include topics such as timber condition, insect or disease infestation, the integration of wildlife and parks issues, fish and wildlife habitat concerns, access management strategy and other resource concerns in the overall harvesting plan.

CURRENT YEAR PROPOSALS

The previous year's activities and particularly the second and third year projections as identified in the previous AOP form a base of reference for the proposals presented in the current year's AOP. The following information is required for the current year's operations and will form the basis upon which the plan is approved.

1. Harvesting and Access

A harvest and road lay-out map is required, showing location of harvest areas (cutblocks) and roads within the **general operating area(s)** of the plan. See Appendices III and IV for examples of required information. The map and accompanying tables will concentrate on those activities scheduled for the planning year. The harvest lay-out map shall be at a scale of at least 1:50,000 and show the following detail within the general operating area:

a) Location of proposed access roads and cut-block or cutting compartment boundaries.

b) Location and status of existing cut-overs and roads. (The map should detail the activity carried out over the last 3 years).

c) Proposed location and type of watercourse crossings (current year only).

d) Unmerchantable areas (within cut-blocks), inoperable areas (inside and outside of cut-blocks) and existing and proposed permanent reserves (this information may be detailed on a map or in accompanying text.

e) Key wildlife areas, recreation areas, cabins and trails, environmentally sensitive areas, ecologically sensitive areas, culturally important or heritage sites and traditional use areas (to be performed as a joint endeavor with Natural Resources staff).

f) Season of harvest for proposed cut-blocks or cutting compartments.

g) Location of camps, garage sites and waste disposal sites.

h) Construction, retirement and maintenance schedule for access roads.

i) **Pre-harvest renewal prescription,** detailing planned renewal strategy before area is harvested (should include current year activities and strategy for the next two years). Plans should be consistent with the seedling/stock requirements in sub-section (f) of the Three Year General Projection section.

The lay-out of harvest areas; the construction and tenure of access roads; and the timing or organization of harvesting, renewal and road construction operations are to be conducted in an environmentally sensitive

manner. Particular attention should be paid to mitigating impacts on designated fish and wildlife species and minimizing impacts of insects and disease on regenerating forests.

Annual production targets by individual tree species and product for each operating area should be presented in tabular form (if an operating area incorporates more than one FMU then volume tables should be proportioned accordingly). Harvest areas should be managed on an operating area basis. Harvesting statistics are to be reported on a cut-block or cutting compartment basis. The Geographic Information System (GIS) cut-block numbering system should be employed wherever possible to facilitate easy reference of harvesting areas.

A discussion regarding the renewal strategy (i.e. winter site prep, snow cache, natural regeneration) for the operating area as a whole should also be included, as part of the preharvest silvicultural prescription.

2. Detailed Information

Detailed harvest information may be required for proposals falling within areas known to be sensitive or critical, or areas found to be sensitive or critical during the cruise and preliminary planning phase. The level of detail to be shown will depend on the nature of the concern and on the complexity or sensitivity of the site. Submission of detailed plans will only be required in exceptional cases where the concerns are based on tangible information or identifiable parameters rather than on subjective perceptions. Every effort should be made to identify, for example, sensitive sites or critical habitats or sites vulnerable to insect and disease damage in year three of the harvest projection.

Detailed information requirements may include any or all of the following, but not limited to:

a) Base maps or photo mosaic at a scale of 1: 15,840 showing:
- access and haul roads (all classes);
- landings (bared areas); location reference for stream crossing information form (see Appendix);
- terrain features which may impact the operation;
- protective factors such as buffers on streams, key wildlife or recreational values which may impact the operation;

- identification of ecological reserves or ecologically, historically or culturally sensitive areas worthy of protection.

b) Brief management prescription which includes:
- stand and site description; Harvesting method, reforestation plan;
- Timing of proposed activities;
- Harvest and renewal strategies pertaining to forest protection.

c) Discussion of mitigative measures being taken including:
- Buffers on roads, water bodies, key wildlife or recreational areas;
- Special harvesting techniques or prescriptions in or near:
    - environmentally sensitive sites,
    - critical or endangered habitats,
    - ecologically and culturally important areas,
    - closed zones in provincial parks; and
- Erosion control measures for roads and stream crossings.

An example of a detailed harvest map is provided in Appendix IV.

3. Road Management and Maintenance

Road management and maintenance activities shall be submitted for all existing and proposed roads falling under the jurisdiction of the proponent. The location of the proposed road should be indicated on the general development map. The plan should include a maintenance (upgrade or repair) schedule for all roads undergoing terrain altering construction or maintenance. In addition the plan will outline:

a) The class of road.
    - The class of road -should indicate the standard to which the road will be or has been constructed. Technical information such as width of right-of-way, grade, slope, width of travel surface and general standards of construction should be outlined in appendix (see Appendix V for Road Classification System).

b) The construction/maintenance schedule.
    - The season or time of year that construction occurs. Construction and maintenance activities have the potential to significantly impact terrestrial and aquatic environments. This section should clearly define the type of activity and when it will be carried out.

c) The length of time the road will be required.
    - The life expectancy of a road should be reflected in the class designation for that road.

d) Road retirement proposals.
    - The proposals should include the re-vegetation of disturbed surfaces to stabilize the disturbed soil and minimize erosion. In some instances a case will need to be made to justify abandonment and reclamation activities (e.g. when the road is also being used by commercial fisherman, trappers, mining industry or for gravel extraction).

e) Proposed road closures and vehicle access control structures.

Some of the previous information is also included in the Stream Crossing Information form (Appendix VI). The proponent is required to complete this form for all proposed creek crossings.

A road numbering system compatible with GIS should be employed.

4. Contingency Areas

Contingency areas are areas of timber which have been identified and set aside for emergency use. The requirement for contingency areas is generally weather related; therefore, the criteria used in their selection should include the environmental impact of operating such sites during poor operating conditions. Contingency areas should be specified in the AOP (two year projection section) and should be consistent with the harvest sequence as much as possible. The planning detail for primary contingency blocks should approximate the detail required for blocks in the AOP.

5. Forest Renewal Activities

Forest renewal activities should include discussion of planning rationale in support of forest renewal objectives and the reforestation activities proposed for the planning year (i.e. choice of reforestation systems, species, planting methods, standard to which the area will be stocked, stand tending strategy, and insect and disease protection measures being taken). Renewal plans will address resource issues and environmental concerns that may influence renewal strategies and field operations of the proposed program. In addition, the renewal plans will take into account the requirements of various operating guidelines which govern renewal activities (e.g. the *Forest Management Guidelines for Wildlife in Manitoba).* The following detail also must be provided.

a) A key map suitably scaled to show the general location and type of renewal activity that is to occur including mechanical or chemical site preparation and roads that will be used to gain access to treatment areas.

- species and stock type to be planted,
- hectares to be treated and/or planted,
- timing of treatment, soil type and vegetation type.

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b) On a 1:50,000 map (harvest and access map may be used if appropriate) illustrate the location and area configuration of forest renewal activity.

- treatment type,
- year harvested,

6. Stand Tending and Enhancement

Stand tending- activities should be presented at a level of detail that is similar to the harvesting proposals (i.e. a key map at a scale of 1:250,000 and when deemed necessary detailed maps outlining specific activities). In many cases, particularly treatments involving application of chemicals, background information on the area to be treated will be required. Such information would include previous covertype, or vegetation type, current stocking levels, condition and vigour of crop species, soil type, terrain and drainage patterns, access and present use patterns (see Appendix VII Standards Regeneration).

GLOSSARY OF TERMS

Cut-block	A singularly unique harvest area, identified by distinct boundaries and readily identifiable on forest cover type maps.
Cut-block design	The configuration or lay-out of proposed cut-blocks on a forest cover type map. The limit of harvesting within stands are clearly indicated by the cut-block boundaries.
Cutting compartment	A group of cutblocks or a defined area being progressively harvested over one or two years.
Key or critical extraction areas	Specifically identified areas that are highly vulnerable to resource activities. Examples include but are not restricted to calving grounds, nesting sites of rare and endangered birds, deer yarding areas, remnant habitat of rare and endangered plant or animal species, areas of archeological or cultural significance, steep erodible slopes and soils susceptible to compaction.
Operating area	A contiguous area upon which forest development activities are planned. Impacts of proposed harvesting activities on various resource concerns (i.e. ecological diversity, habitat management, access, water management) are assessed based on the entire operating area.
Proponent	Includes a) Forest Management License Holders and b) the Forestry Branch (on behalf of quota holders, community sales, special allocations, auctions and commercial permits).
Stake-holders	Individuals or groups who may be either directly or indirectly affected by proposed operations, and therefore have a vested interest in providing input to assist the proponent in the development of a harvesting plan.

APPENDICES

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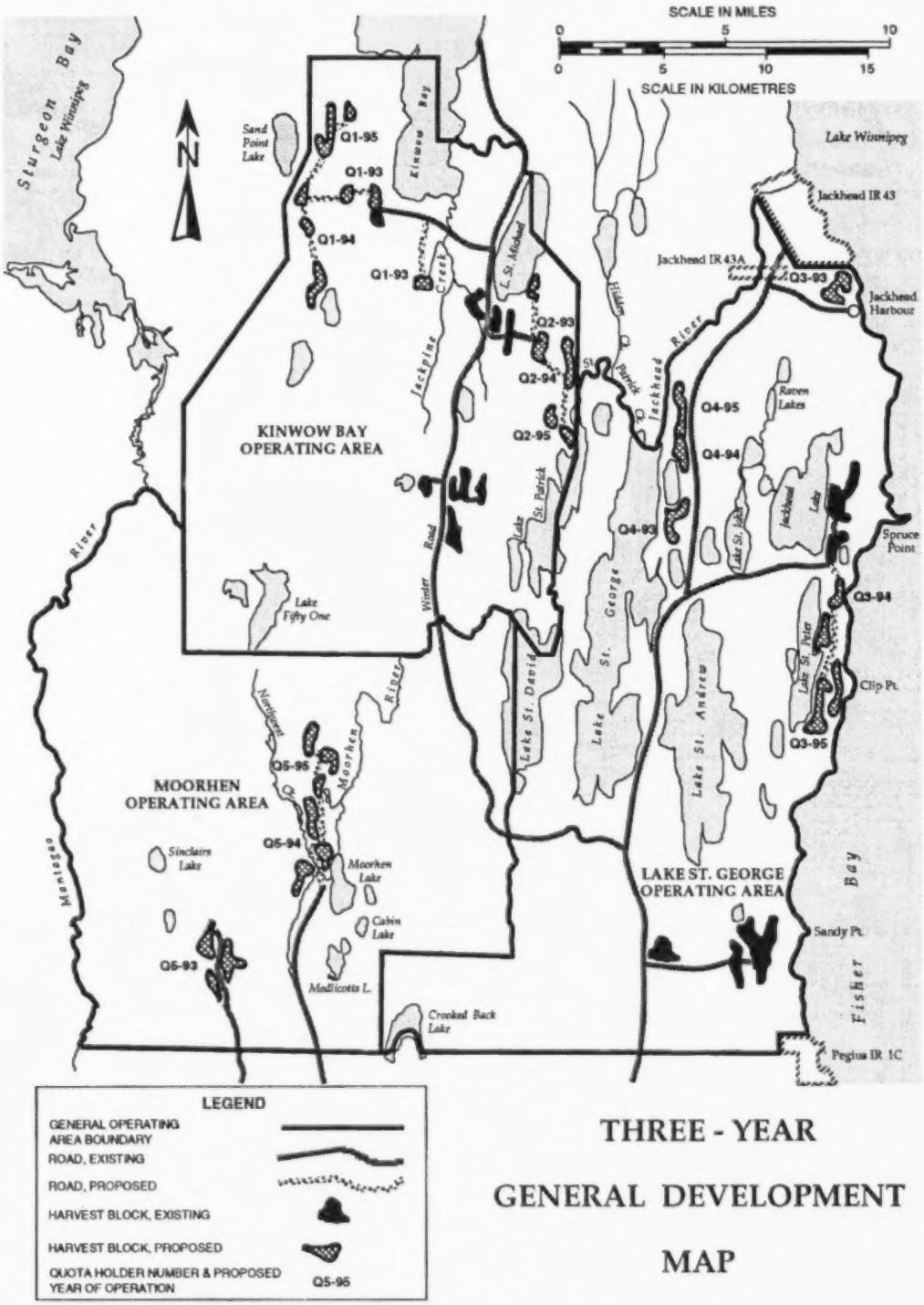
SISTERLINE OPERATING AREA

PROPOSED CUT BLOCKS

Block Number	Size (hectares)	Cover Type	Harvest Season	Volume (est. m)	Renewal Plan
1-01	3.2	softwood	winter '93	300	natural regeneration
1-02	5.7	mixedwood	winter '93	500	site prep/plant
1-03	3.3	softwood	winter '93	550	site prep/plant
1-04	56.0	softwood	fall/winter	2500	site prep/natural
2-01	7.0	mixedwood	winter '94	500	site prep/plant
2-02	36.0	hardwood	winter '94	1500	natural regeneration
2-07	13.0	softwood	winter '95	750	site prep/plant

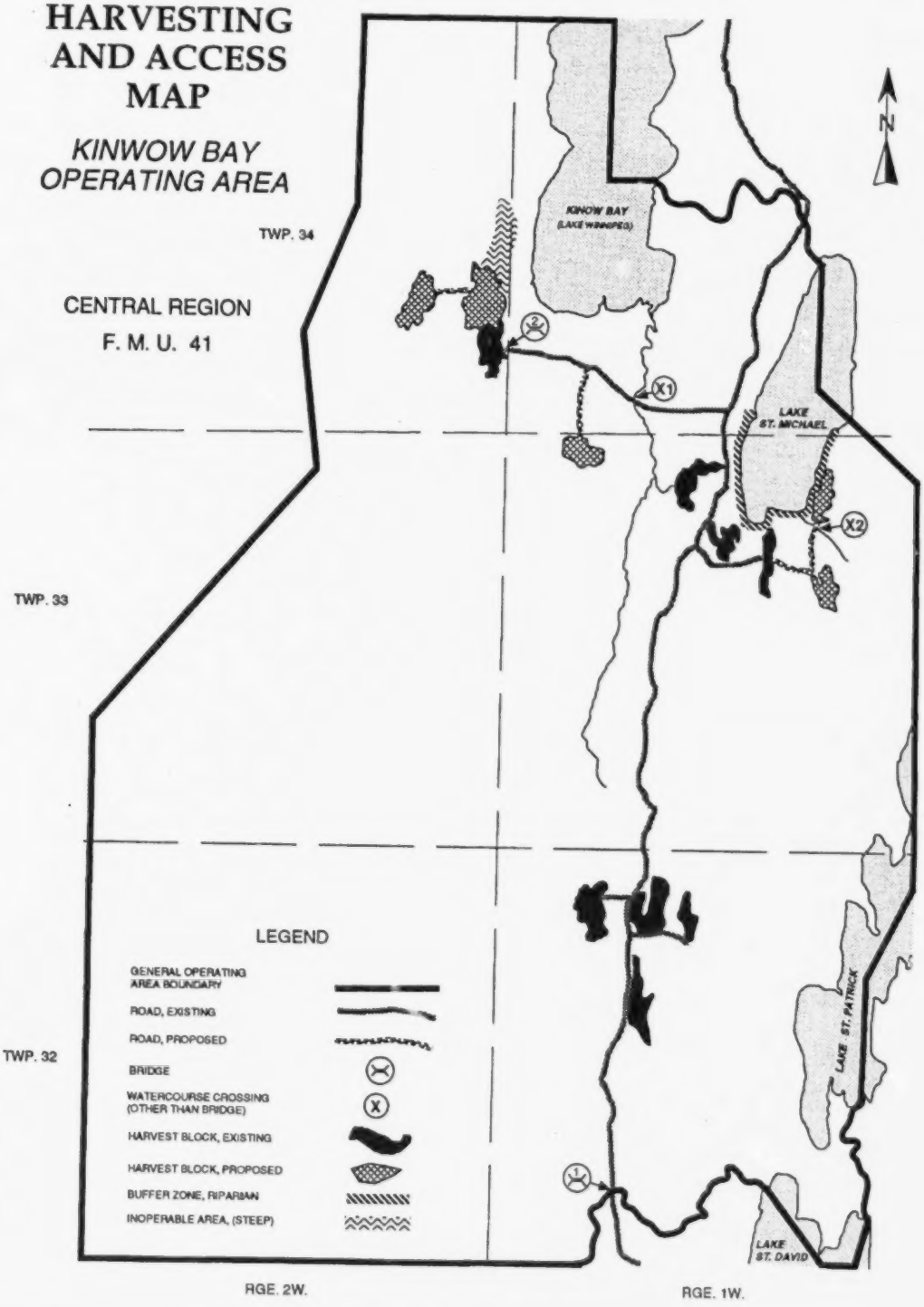
EXISTING CUT BL0CKS

Block Number	Date Harvested	Size (hectares)	Block Status	Silvicultural Treatment
3-01	'89 to '91	34.4	completed 78 % stocked	planted ws, bs, container
3-02	'91 to '93	34.7	completed	pending regeneration survey
3-03	winter '93	3.6	incomplete selective cut	

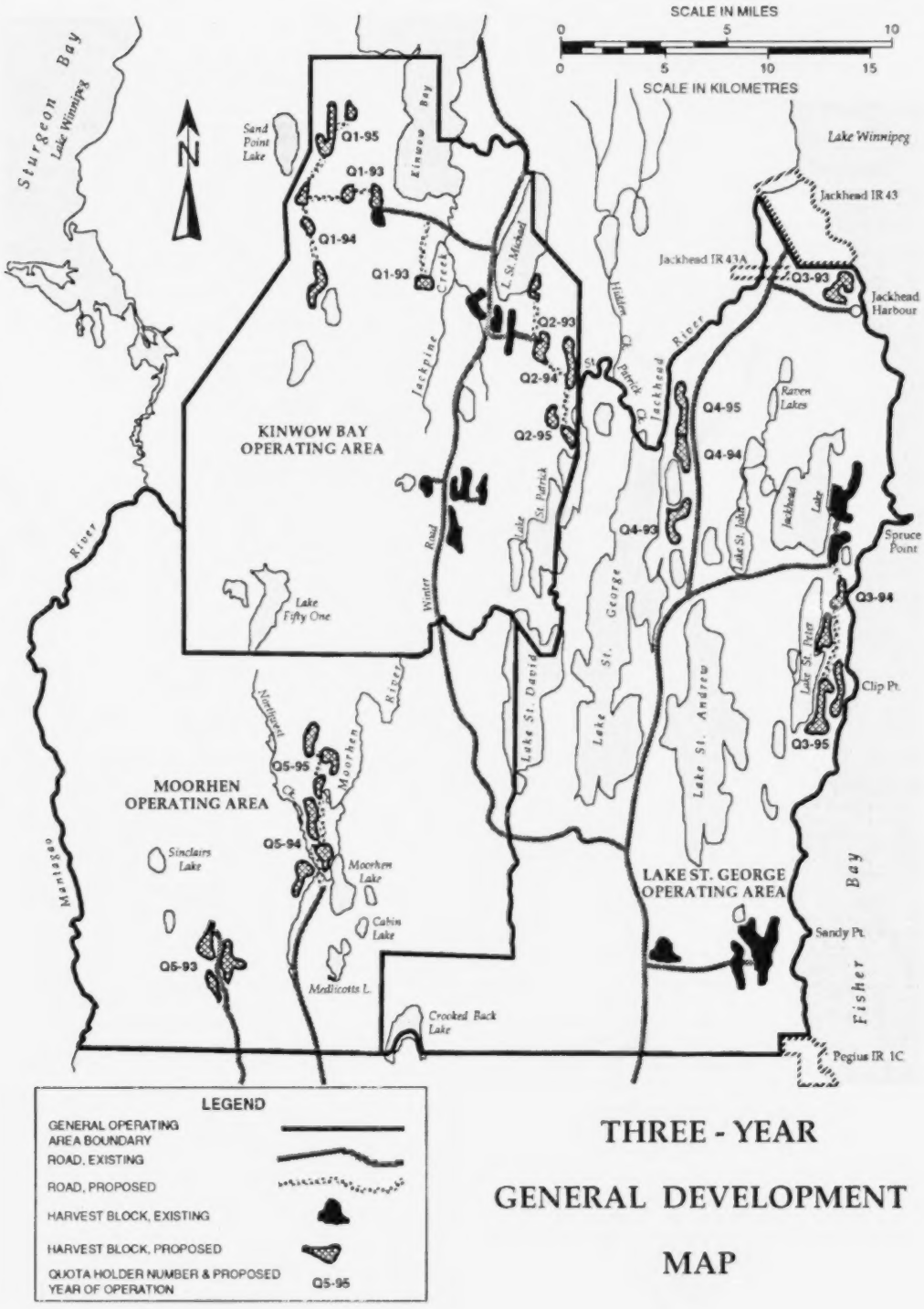


THREE - YEAR GENERAL DEVELOPMENT MAP

APPENDIX II: GENERAL DEVELOPMENT MAP



APPENDIX III: GENERAL OPERATING AREA HARVEST AND ACCESS MAP



THREE - YEAR GENERAL DEVELOPMENT MAP

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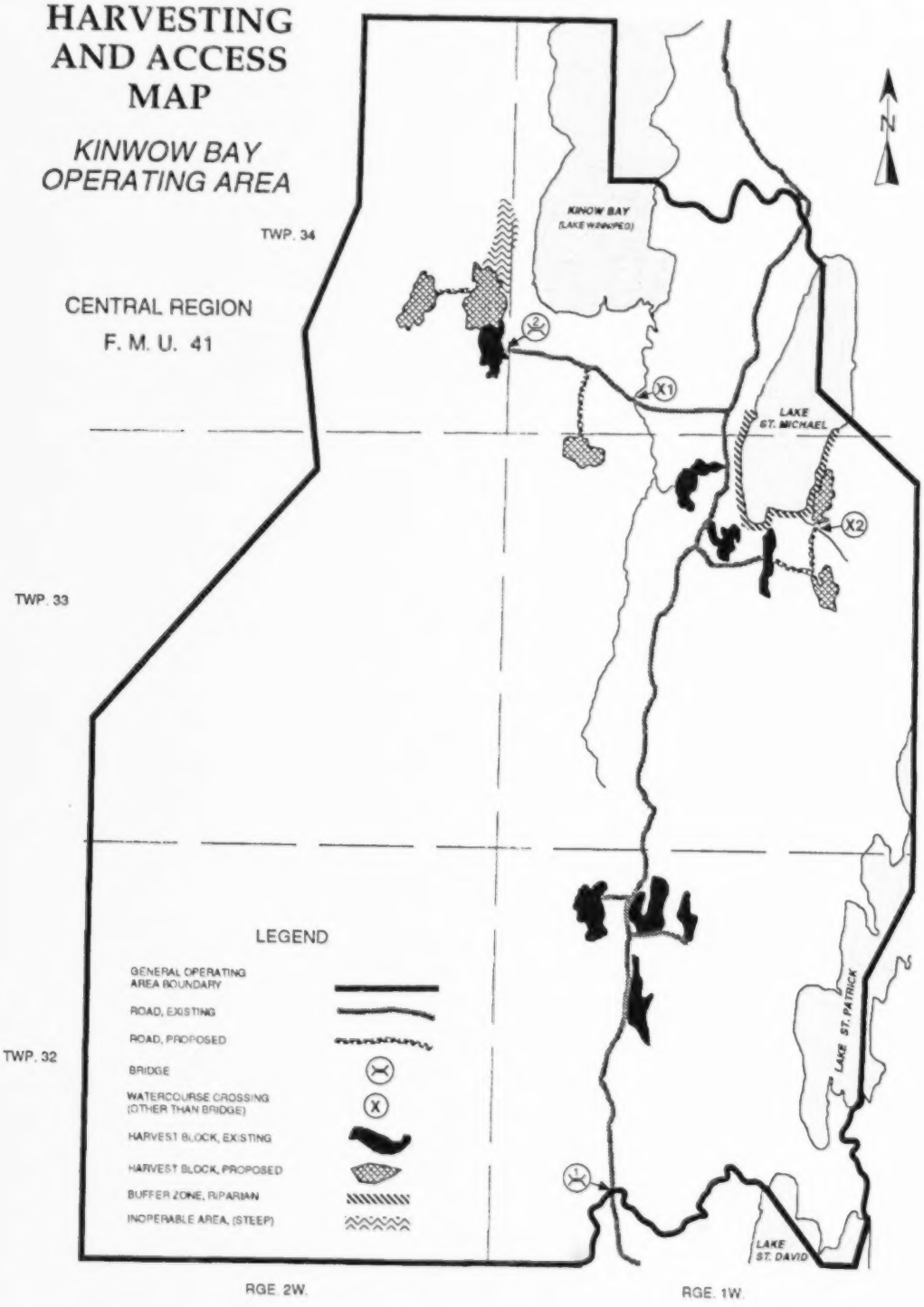

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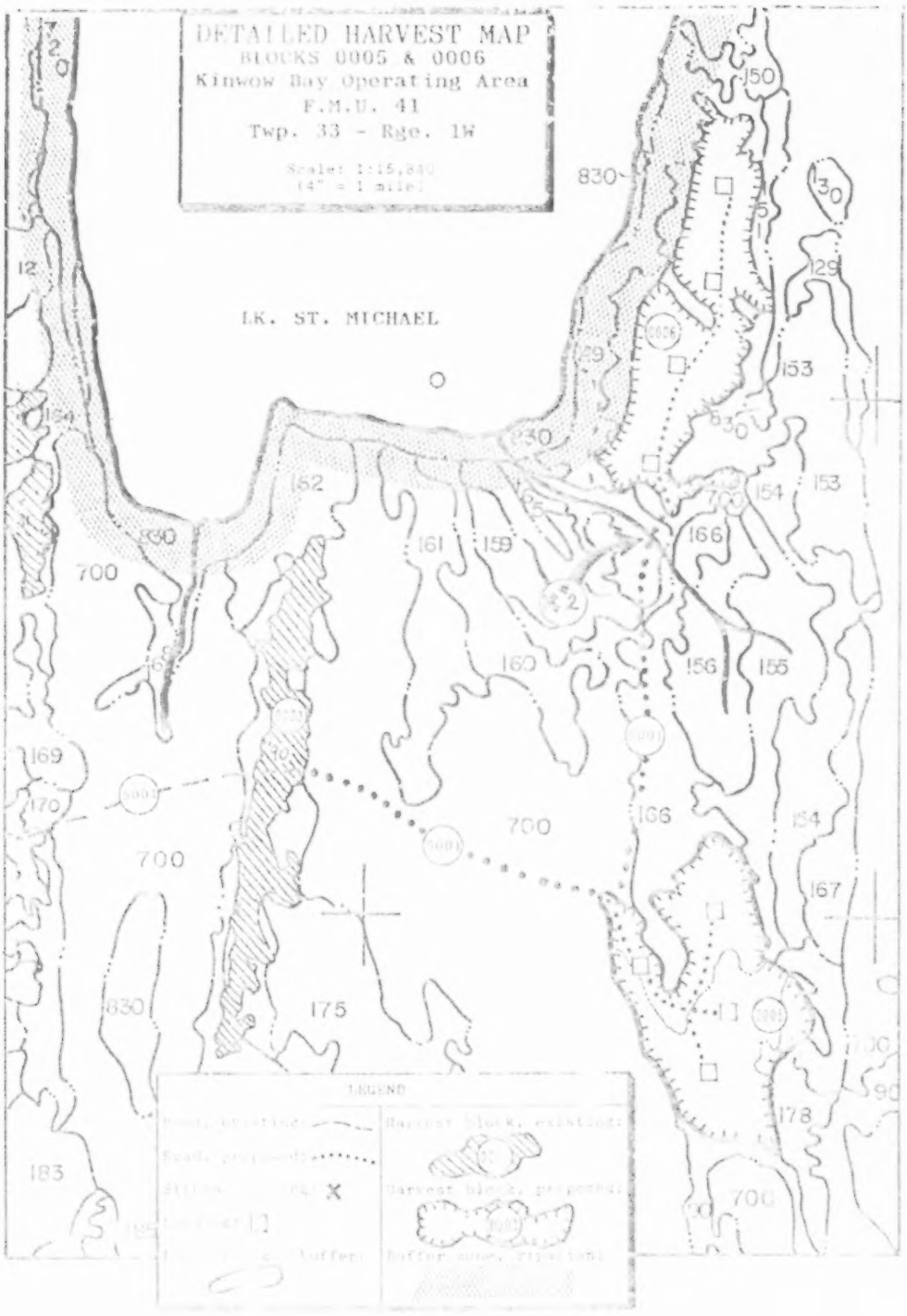
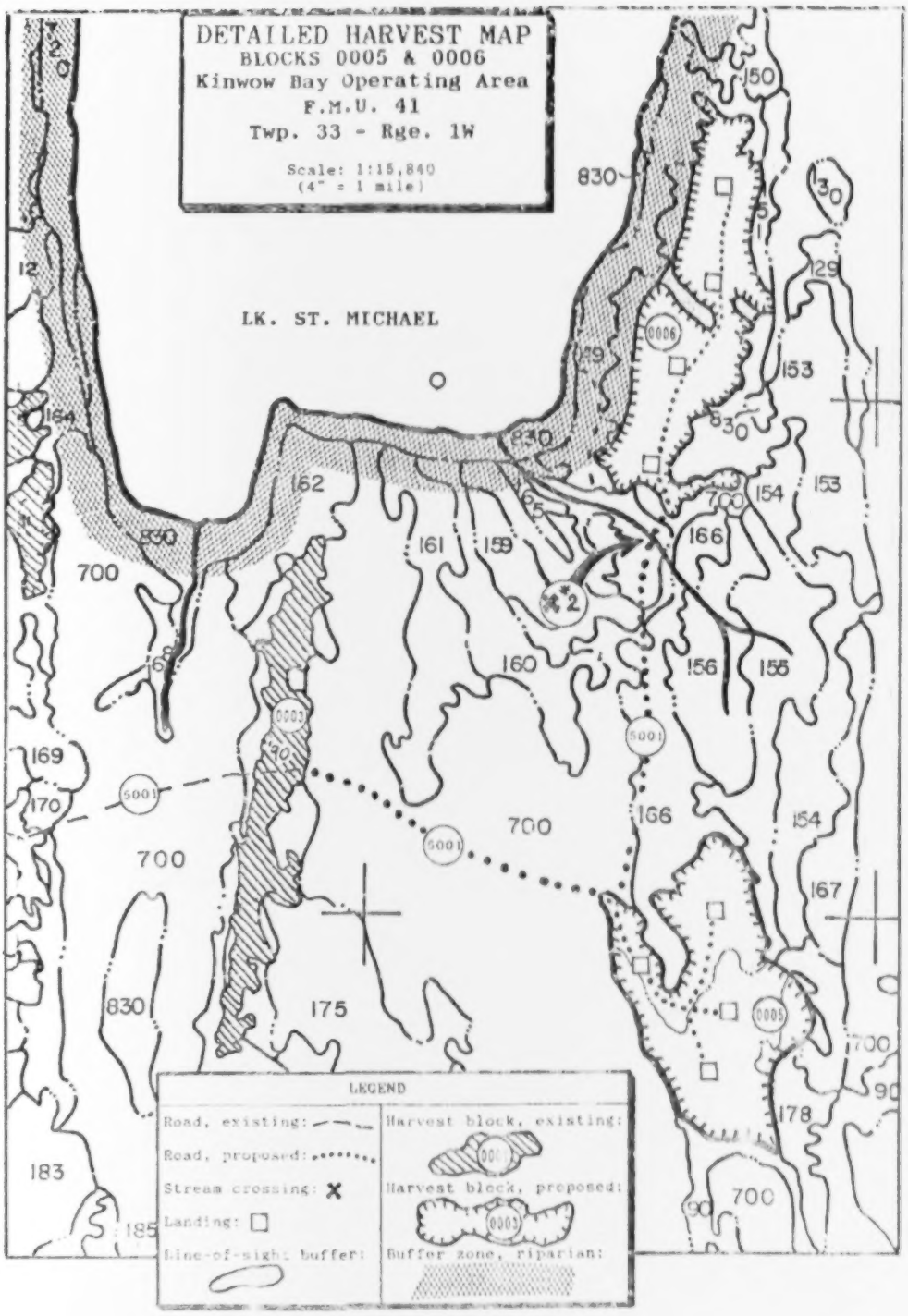


APPENDIX IV: DETAILED HARVEST MAP



APPENDIX IV: DETAILED HARVEST MAP

ROAD CLASSIFICATION SYSTEM

There is a need for a province wide classification system for logging roads that describes the standard to which the road is built. In this regard the following is proposed.

SUGGESTED UNIFORM ROAD CLASSES

CLASS I	Primary weather roads designed to safely sustain speeds up to 80 km/h. These roads have a life of 20 years or more.
CLASS II	Secondary all-weather roads with a life expectancy up to 20 years. Design standards are less than class 1.
CLASS III	Low grade road providing dry weather access to harvest areas. This class of road would have a life expectancy of 2-7 years. Some grade work and ditching may be required.
CLASS IV	Unimproved trail on high ground with no development beyond clearing and stumping. May provide dry weather access into harvesting areas. The life expectancy of this class of road is between I and 5 years.
CLASS V	Unimproved seasonal trail with no development beyond clearing and stumping. Trail is occasionally routed through lowland meadows or swamps and therefore require frost conditions for travel. The life expectancy for this class of road varies considerably (from 1- 10 years) depending on the nature of the operation.
CLASS VI	Unimproved winter trails which are primarily routed through combinations of swamp, meadows and water bodies. All crossings are ice crossings. Intermittent areas of high ground may be cleared and stumped. Class VI roads are distinguishable from Class V roads with the inclusion of major crossings on water bodies. The life expectancy of these roads can range from a single season to 5 years or more.

NOTE:

In some instances the class of road may be determined independent of a major but isolated development requirement such as a bridge crossing. for example, a stumped winter road may encounter a major stream on route to a long term winter cutting area. Although the road is no more than a stumped trail at a class V level, a bridge may be required to cross the stream due to the late freezing of fast water and the presence of springs on the embankment. The presence of the bridge in this instance should not influence the over all class designation for the road.

Access requirements for reforestation activities should be a consideration in determining the class designation for a road.

The up-grading of existing roads or re-using abandoned roads will require prior approval and re-classification.

MINIMUM STANDARDS OF CONSTRUCTION

item (maximums)	road class I	II	III	IV	V	VI
safe design speed KMH	80	70	50	n/a	n/a	n/a
right of way width (metres)	45	30	20	15	n/a	n/a
road surface width (metres)	10	7.5	5	4	5*	5*

* total cleared/bared area

A province-wide road numbering system that may be easily illustrated on operational and planning maps should be adopted. The road number should indicate the class or standard to which the road has or will be constructed.

e.g. Road number **3006**

The first digit represents the class of road while the following digits represent the road number. The GIS system could tack on identifiers that would zero in on township and range.

APPENDIX VI: STREAM CROSSING FORM

STREAM CROSSING INFORMATION
Fisheries Branch

I) Identification of site chosen:_____

(name)

II) Location: L. S._____ Sec._____ Twp._____ Rge._____

(provide covertype map and/or air photo identifying crossing location)

III) Reason(s) for selecting this site for crossing:

_____

_____

_____

_____

_____

_____

IV) Has Regional Fisheries Manager been contacted for input on this site selection?

Yes _____ No_____ Name of contact_____

IV) Structure to be used for crossing is:

_____Permanent bridge
_____Temporary bridge
_____Portable bridge
_____Ice bridge
_____Treated timber bridge
_____Open bottom arch culvert
_____Horizontal ellipse culvert
_____Closed bottom arch culvert

_____Round Culvert (dia.___)
_____ Multiple Culvert (dia.____)
_____Culvert fishways
_____ Ford or low level crossing
_____Other(_____
_____
_____)

VI) Estimated date of construction start : Day_____ Month_____ Year_____

VII) Estimated date of construction completion: Day_____ Month_____ Year_____

VIII) Estimated life span of crossing _____

IX) Abandonment plans:

_____

_____

_____

_____

_____

_____

X) What will be done to reduce environmental impact(s) during and after construction - consider retention and maintenance of natural stream conditions, provision of fish passage, minimization of sedimentation, preservation of riparian vegetation, ,prevention of pollution, etc.

_____

_____

_____

_____

_____

_____

XI) Provide sketches (overhead and profile) of the crossing with structures in place. Note: dimensions such as width, height, slope and materials to be used.

Company name: _____

Submitted by: _____ Phone No. _____

Date: _____

APPENDIX VII: FOREST REGENERATION STANDARDS

2.2 FOREST REGENERATION STANDARDS

From: 1991 Forest Regeneration Survey manual

Stocking estimates for each survey block determine whether the site is considered satisfactorily regenerated (SR) or not satisfactorily regenerated (NSR) according to the provincial forest regeneration standards.

The stocking requirements have been developed by measuring natural forest stands and predicting the stocking levels necessary at establishment to ensure proper forest stand development (Anon, 1989). Four distinct regeneration standards were developed that reflect the four covertypes recognized by Manitoba's Forest Resource Inventory:

Original Covertype	Regeneration Standard	Stocking Requirements
> 75 % of total basal area stocking consists of coniferous species	**SOFTWOOD, "S"**	≥75conifer
> 50 % but ≤ 75 % of total basal area is coniferous	**MIXEDWOOD "N'** (softwood-hardwood)	≥75% total stocking and ≥45% but <75% conifer stocking
> 25 % but ≤ 50 % of total basal area is coniferous	**MIXEDWOOD "N"** (hardwood-softwood)	≥75% total stocking and ≥ 20 % but < 45 % conifer stocking
≤ 25 % of total basal area and consists of coniferous species	**HARDWOOD "H"**	≥75% k" stocking <20% conifer stocking

An estimate of the number of seedlings per hectare (density) is based on an even distribution of plots over the survey area. The total count of seedlings on every third plot provides a measure of density and indicates the crowding of individual seedlings within the stocked areas. By using the plot-count method [1] in combination with the stocked plot technique a meaningful measure of seedling regeneration can be made.

Actual area occupied, crowding or spatial distribution may be sufficiently gauged such that reliable projections of future crops could be made, or silvicultural prescriptions undertaken. A random spatial distribution of seedlings implies a homogeneous population with uniform seedling survival ensuring that cut overs are evenly stocked.

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per plot is expanded to a hectare basis. In Manitoba a total count is made on every third millihectare plot.

1 The plot-count method counts established seedlings on a series of designated plots. The mean number of seedlings

[1] The plot-count method counts established seedlings on a series of designated plots. The mean number of seedlings per plot is expanded to a hectare basis. In Manitoba a total count is made on every third millihectare plot.